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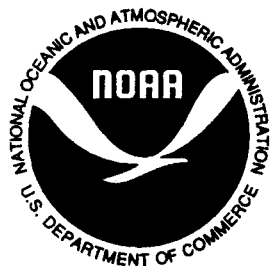
**NATIONAL MARINE FISHERIES SERVICE
HABITAT CONSERVATION EFFORTS
IN THE SOUTHEASTERN
UNITED STATES FOR 1990**

by:

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and
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December 1991



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ABSTRACT

The U.S. Army Corps of Engineers (COE) in the southeastern United States regulates development activities affecting thousands of acres of wetlands every year. Despite substantial regulatory effort, the COE does not monitor the effectiveness of its regulatory program with regard to marine and estuarine fishery habitat conservation and other purposes of the Clean Water Act, River and Harbor Act, Fish and Wildlife Coordination Act and related legislation. The Habitat Conservation Division of the National Marine Fisheries Service (NMFS) Southeast Region maintains a computerized database from which some measure of effectiveness of COE and other federal regulatory and civil works programs in the southeast is possible. This report provides information, for calendar year 1990, on the scope, significance, and effectiveness of the COE Regulatory Program and the NMFS Habitat Conservation Program in the southeastern United States.

In 1990, in the southeast, the NMFS reviewed 4,120 project applications or proposals for work in waters of the United States. Of these, detailed information on proposed habitat losses associated with 872 projects is available. Alteration of more than 31,282 wetland acres was proposed in association with the 872 projects examined. Of this amount, the NMFS recommended conserving 13,092 wetland acres and mitigation of 12,547 wetland acres. The COE fully accepted NMFS habitat conservation recommendations on about 75 percent of the projects reviewed. NMFS recommendations were partially accepted 7 percent of the time and not accepted 12 percent of the time.

INTRODUCTION

The National Marine Fisheries Service (NMFS) is a lead federal agency in management of living marine resources in the United States. A goal of this management is the optimum sustained yield of renewable fishery resources. This effort benefits the nation's recreational and commercial fishing industries and ultimately the seafood consumer. An important part of the NMFS's fishery management efforts is the conservation of aquatic habitat that supports fishery resources. In the NMFS Southeast Region (SER), which includes coastal areas from North Carolina through Texas, Puerto Rico, and the U.S. Virgin Islands, most of these efforts are directed at estuarine and nearshore coastal habitats because of their importance to NMFS trust resources. In the SER, about 96 percent of the commercial fishery and over 50 percent of the recreational fishery is estuarine dependent (Lindall and Thayer 1982).

Many fisheries in the SER are severely stressed and are managed by the NMFS and by Fishery Management Councils (FMC) that were established in accordance with provisions of the Magnuson Fishery Conservation and Management Act. Federally managed fisheries include red drum, reef fish, coastal migratory pelagic fish, stone crab, shrimp, spiny lobster, and corals. Plans for management of other fisheries are under development. Fisheries also are managed by individual states and through interstate compacts. These fisheries include blue crab, oyster, clam, snook, tarpon, seatrout, menhaden, and certain anadromous fish such as striped bass. The combined NMFS/FMC fishery management efforts emphasize habitat conservation through participation in various federal regulatory and review processes as authorized by the Fish and Wildlife Coordination Act, Clean Water Act, River and Harbor Act, National Environmental Policy Act and others.

Since 1971, the NMFS's habitat conservation program in the SER has reviewed thousands of wetland alteration requests in association with U.S. Army Corps of Engineers (COE) regulatory program. Additional efforts involve the review of unauthorized activities in wetlands, review of federal water

development projects, and review of U.S. Coast Guard bridge permit applications. The NMFS is a strong advocate of fisheries conservation and provides impact assessments and recommendations to federal regulators and construction agencies. These efforts are aimed at avoiding and minimizing harmful project effects on marine, estuarine, and anadromous fishery resources.

The effectiveness of the NMFS habitat conservation effort is evident from a sample of 9,149 of 39,050 projects reviewed by the SER between 1981 and 1989 (Mager 1990a). These projects called for proposed alteration of almost 684,000 acres of wetlands. Related summary information and program results also are provided in Lindall and Thayer (1982) and Mager and Thayer (1986). In addition, annual reports have been produced since 1985 (Mager and Hardy 1986; Mager and Keppner 1987; Mager and Ruebsamen 1988; and Mager, 1990a and 1990b). The results and analysis of the SER's habitat conservation efforts for 1990 are provided in this report.

METHODOLOGY

A total of 872 project actions were examined using a computerized database. A detailed description of the methods used in data gathering and structuring is provided in Lindall and Thayer (1982) and in Mager and Thayer (1986). The acreage amounts presented for the 872 projects surveyed for 1990 were obtained mainly from on site reviews by NMFS contractors or NMFS biologists. Additional information was obtained from public notices and from project plans when adequate to determine acreage and habitat types proposed for alteration.

RESULTS

Overview

During 1990, the NMFS reviewed 4,120 proposals to alter wetlands. These comprise 61 percent of all projects received for review by the NMFS nationwide in 1990 (NMFS unpublished data). Of these, 3,764 projects, or 91 percent of all proposals, involved regulatory efforts by the COE in association with Section 10 of the River and Harbor Act and Section 404 of the Clean Water Act. The NMFS also reviewed 269 unauthorized projects, 56 COE federal water development projects, and 31 bridge proposals under Coast Guard authority. The greatest number of project proposals, 1,608, was received from the Jacksonville District (Florida, Puerto Rico, and the U.S. Virgin Islands). We also reviewed 801 projects from the New Orleans District (Louisiana); 447 from the Galveston District (Texas); 434 from the Charleston District (South Carolina); 376 from the Wilmington District (North Carolina); 327 from the Mobile District (Mississippi, Alabama, and part of Florida); and 127 from the Savannah District (Georgia).

The NMFS did not oppose actions specified in 2,764 (67 percent) of the projects reviewed. Of this number, 1,833 were found to have little potential to adversely impact fishery resources. An additional 931 projects were located inland where use by NMFS trust resources could not be documented. Many of these latter projects, however, may have impacted resources under purview of the Fish and Wildlife Service or the Environmental Protection Agency. The NMFS recommended minor modification of 683 projects (16 percent), major modification of 439 projects (11 percent), and recommended against COE authorization of 234 projects (6 percent).

Of the projects reviewed, 872, or 21 percent, were selected for close examination following an initial screening that indicated potential for significant adverse impact to NMFS trust resources. The detailed investigations provided greater information on the type and size of the affected habitat, the project type and location, and the nature of the activity (e.g., dredging, filling, impounding, etc.). In association with the 872 projects sampled, about 31,283 acres of wetlands were proposed for alteration. This amount includes 5,441 acres of dredging, 2,739 acres of filling, and 23,103 acres of alterations such as impounding and draining. The NMFS did not object to work affecting 13,092 acres. Our recommendations called for the conservation of 18,191 wetland acres (Table 3, columns 7, 8, and 9) and creation or restoration of an additional 12,547 wetland acres (Table 3, column 10).

Regulatory Authority

The Clean Water Act and the River and Harbor Act are the most consequential federal statutes for controlling wetland alteration. A total of 782 Clean Water Act and River and Harbor Act authority proposals, involving 25,635 acres of habitat, are contained in our sample data. This represents about 90 percent of all projects and 82 percent of the total area of wetlands contained in 872 proposals that underwent close examination (Table 1). Almost all of the area described as "potentially conserved" later in this report, or for which mitigation was provided, involved Clean Water Act and River and Harbor Act regulatory requirements. Within the sample, 55 of the 269 violations of relevant laws and regulations accounted for 3,702 acres of wetland alteration. The sample data also contain 31 COE water-development projects involving 2,560 acres of wetlands for which alteration was specified. This alteration was almost exclusively associated with maintenance dredging. COE water-development projects comprise about four percent of the total projects and eight percent of the total wetlands contained in the sample. Only 31 Coast Guard bridge proposals were received during the year and of these only about 4 projects, involving 16 acres, were significant. NMFS reviews were conducted in accordance with provisions contained in the Fish and Wildlife Coordination Act.

Activity Type

Permit and other proposals were assigned one of 18 possible activity codes for computer logging (see under Table 2). Use of different codes allowed ascertainment of the amount of habitat affected by the various project types (Table 2). Six categories of projects accounted for 93 percent (29,043 acres) of the total area proposed for alteration. In their order of importance, these are: marsh management activities (MM in Table 2; 18,355 acres); water flow manipulations (WR in Table 2; 3,014 acres); barriers and impoundments (BA in Table 2; 2,981 acres); maintenance dredging (MD in Table 2; 2,573 acres); beach nourishment projects (BE in Table 2; 1,017 acres); and mining activities (MI in Table 3; 1,001 acres). Marsh management, maintenance dredging, and beach nourishment projects accounted for 90 percent of the total area (13,092 acres) where the NMFS did not oppose requested alterations. Marsh management and water flow manipulation projects accounted for 71 percent of the area potentially conserved and 91 percent of the mitigation area.

The NMFS did not oppose activities that would result in temporary or minor wetland alteration. Activities affecting 13,092 acres of wetlands were not opposed since 11,742 acres (90 percent) of the wetlands involved only would have a temporary impact or fishery related impacts would be minimal.

These activities included marsh management projects in areas not accessible by marine organisms or where fisheries access would not be restricted unduly, maintenance dredging projects, and beach nourishment projects. Mitigation involving 12,547 wetland acres was recommended to compensate for damages associated with the remaining 1,350 acres of habitat modification accepted by the NMFS. The overall recommended incidence for providing compensatory habitat was about 9:1.

Marsh management activities were confined mainly to Texas and Louisiana where land subsidence is most prevalent. Marsh management activities usually involve wetlands impoundment or water control. The environmental impact of these activities is poorly understood and the projects are often unsuccessful in meeting marsh conservation objectives. A detailed discussion of marsh management practices in Louisiana is provided in Cahoon and Groat (1990). The NMFS's primary concern is that the manipulations involved usually restrict marsh access by living marine resources that utilize the marsh for forage, cover, and nursery purposes. The relevance of this concern is exemplified by two water-flow manipulation projects located in Texas and Louisiana where a combined area of about 10,000 acres is involved (Table 2).

Affected Areas

Information regarding areas affected by the projects reviewed is retrievable from the database by state, county, and major and secondary waterbody. For brevity, this information is provided by state only (Table 3). Most of the requested habitat alterations were located in Louisiana (60 percent). Texas (20 percent), North Carolina (11 percent), and South Carolina (5 percent) also had large areas of proposed development. The remaining four percent of proposed alteration was distributed among Florida, Georgia, Puerto Rico, Mississippi, and Alabama. Data from the U.S. Virgin Islands were not available. More than 91 percent of the 5,441 total acres proposed for dredging (Table 3, column 3) were located in North Carolina, South Carolina, and Louisiana. Most of the 2,739 total acres proposed for filling (Table 3, column 2) were evenly distributed except in Alabama, Mississippi, and Puerto Rico where there were fewer projects and small acreage amounts. More than 99 percent of the 23,103 total acres proposed for other manipulations such as impounding, draining, and water flow modification occurred in Louisiana, Texas, and North Carolina (Table 3, column 3).

Excavation of previously dredged and low value wetlands was generally unopposed since unvegetated subtidal habitats were usually involved. This included 3,343 wetland acres (Table 3, column 4), of which 70 percent involved maintenance dredging. Much of this (1,995 acres) was located in North Carolina. An additional 440 acres were dredged for obtaining beach nourishment material. This work largely involved subtidal, unvegetated inlet and offshore areas in North and South Carolina. In North Carolina, allowable filling of wetlands impacted 482 acres; in Florida 289 acres; in Louisiana 264 acres; in South Carolina 157 acres; and in Georgia 115 acres (Table 3, column 5). In states where filling occurred, most work involved beach nourishment activities, road and bridge construction, and disposal of dredged materials. Almost all the accepted marsh management activities and hydrological manipulations (Table 3, column 6) occurred in Texas and Louisiana.

Habitat Types

Wetland types proposed for alteration are identified according to 23 vegetation and substrate types (Table 4) and according to classifications provided in Cowardin et al. (1979) (Table 5). Salt marsh (Table 4) comprised the largest wetland category considered for alteration (16,774 acres) and included large

areas of saltmeadow cordgrass (14,592 acres) and smooth cordgrass (1,167 acres). Considerable amounts of unvegetated submerged bottom (11,874 acres) and freshwater wetlands of various types (2,207 acres) also were considered for alteration. The freshwater wetlands were comprised mostly of hardwood swamp (1,856 acres). Development of a significant area of submerged vegetation (346 acres) also was proposed.

Most of the habitat modifications accepted involved saltmeadow cordgrass wetlands (8,449 acres) and unvegetated aquatic habitats (3,857 acres). These alterations involved mostly water control rather than direct wetland alteration. Potentially conserved wetlands were mostly saltmarsh (8,181 acres), unvegetated submerged bottom (8,017 acres), hardwood swamp (1,467 acres), and submerged aquatic vegetation (342 acres). More than 91 percent of the associated mitigation areas involved modifying marsh management plans and hydrological manipulation of saltmeadow cordgrass marshes. NMFS recommendations involving marsh management focused on maintenance of wetland access by living marine organisms, maintenance of nutrient and energy flux, and conservation of wetland habitat values.

Most of the survey area designated for possible development (27,325 acres) involved estuarine habitats (Table 5). Of the remaining area, about 1,103 acres of marine habitat; 2,074 acres of palustrine habitat; and 781 acres of riverine habitat were proposed for alteration. The NMFS recommended against modification of 10,761 acres of estuarine, 1,036 acres of marine, 549 acres of palustrine, and 745 acres of riverine wetlands. Most of the area recommended for conservation involved estuarine (16,564 acres) and palustrine (1,525 acres) wetlands. Areas where mitigation was recommended were almost entirely estuarine (12,089 acres) and palustrine (455 acres) wetlands.

Effect of NMFS Recommendations

Full implementation of NMFS recommendations would have resulted in the conservation of 18,191 wetland acres and mitigation of 12,547 wetland acres. However, final disposition of a permit or federal project rests with the COE and resource agency recommendations are not always implemented. In association with this situation, and as a measure of our effectiveness, the database records the extent that the NMFS's recommendations are implemented by the various COE districts (Table 6). A follow-up survey of 292 issued permits indicates that the COE accepted NMFS recommendations on about 75 percent of the permit applications examined. NMFS recommendations were partly accepted or rejected on 13 percent and 12 percent, respectively, of the follow-up sample. The Savannah, Charleston, Wilmington, and Mobile Districts showed the highest acceptance rates (between 100 and 82 percent). The lowest acceptance rates were in the New Orleans, Galveston, and Jacksonville Districts (between 60 and 30 percent).

The 292 issued permits contained in the follow-up analysis authorized alteration of 10,979 wetland acres, or more than 78 percent of the 14,144 acres involved in the sample (Table 7). More than 97 percent of this area was in Louisiana and involved primarily marsh management projects where aquatic habitat access by living marine resources would result from work approval. The Jacksonville and New Orleans Districts, respectively, authorized 68 and 61 percent more area of wetland development than was recommended by the NMFS. The remaining districts in the southeast authorized six percent or less (range 6 - 0 percent) of the proposed wetland development area accepted by the NMFS. The NMFS recommended that 2,336 acres of mitigation be added as a condition of project approvals and the COE authorized 2,542 acres, or 206 acres more than was specified. This difference involves mitigation that was authorized in situations where the NMFS concluded that either project modification not involving mitigation was needed or the likelihood of attaining needed mitigation was low.

DISCUSSION

Nationwide, about 20,000 acres of coastal wetlands are lost annually through natural forces and human-induced perturbations (Alexander et al., 1986). Natural forces include erosion, subsidence, and sea level rise. These factors are largely beyond human control. Most human-induced wetland losses are both controllable and are closely regulated. At the national level, the COE's regulatory program for implementing provisions of the Clean Water and River and Harbor Acts is the principal federal means of controlling wetland alteration. The data presented in this and previous papers (Lindall and Thayer 1982; Mager and Thayer 1986; Mager and Hardy 1986; Mager and Keppner 1987; Mager and Ruebsamen 1988; and Mager 1990a and 1990b) document the significance of this program in the SER. Proposed habitat alteration reported here and in the above-cited reports involve mainly those resources under NMFS purview. Other programs such as those of the Fish and Wildlife Service, the Environmental Protection Agency, and state and local wetland conservation agencies may include aquatic habitats that do not support marine, estuarine, or anadromous fishery resources.

The variation in acceptance of NMFS recommendations among different COE districts in the SER is of concern since greater acceptance provides increased habitat protection. Since the regulations and guidance that control COE involvement in the regulatory process are uniform nationwide, we attribute the variation in NMFS recommendation acceptance to differences in prioritization of public interest considerations within the various districts. This variation may suggest a need for review of such discretionary action in those districts where wetland conservation consistently ranks behind competing economic and social public interest factors that specify wetlands alteration.

In addition to variation between districts in the relative importance of public interest considerations, COE districts are presumably influenced by the timeliness and applicability of the scientific information and assistance provided by the NMFS. Subsequently, these factors affect the degree to which our recommendations are accepted and implemented. These factors are largely controlled by available funding and staffpower which are extremely limited. For example, the entire SER Habitat Conservation Division has only 14 full-time, permanent biologists and supervisory personnel. With additional funding and staff, the NMFS could work closely with COE project managers and permit applicants during early stages of project development. We perceive that the COE, given better information and more input, would heighten the relative importance and implementation rate of NMFS recommendations thereby ensuring that fisheries interests receive full consideration in the decision making process.

Another area of concern is the extensive use of mitigation to offset wetland losses. Current mitigation practices may not successfully offset these losses and existing monitoring and enforcement are not adequate to assess related impacts and needed action (Race and Christie 1982, Race 1985, Thayer et al. 1985, Steinhart 1987). There also is concern that newly created replacement habitats may lack trophic and ecological values that are characteristic of the natural wetlands being replaced. These situations necessitate reevaluation of present day mitigation use. In any case, monitoring of permitted mitigation should be required and a plan for remedial action for unsuccessful mitigation should be a component of permits that are issued.

The data presented herein do not support the frequent allegation that the COE regulatory program and related federal agency review is highly restrictive and prohibits construction of an unacceptable number of worthwhile public interest projects. In actuality, the number of projects for which denial or major modification was recommended and implemented is extremely small in relation to the overall number

of proposals reviewed. In this regard, only 6 percent and 11 percent of the sample projects were respectively identified by the NMFS for permit denial or major modification. Based on our data, it is evident that despite a moderate level of effectiveness in controlling wetlands destruction, COE regulatory efforts in the SER should be considerably strengthened if the current trend in wetland loss and degradation is to be curtailed.

CONCLUSIONS

An indication of the effectiveness of COE and NMFS regulatory and review efforts for controlling wetland alteration in the SER during 1990 is provided. The amount of wetlands involved and subsequently conserved or altered is considerable. Even with uniform national guidance, variation continues to exist among COE districts in the treatment of NMFS's recommendations. This variation is attributed largely to discretionary prioritization of public interest considerations within the individual districts and to the level of involvement by the NMFS in the permit or project review process. Despite the attention being given to wetland protection (e.g., no net-loss), recent acceptance of NMFS recommendations by the COE has not improved. For example, in 1989 NMFS recommendations were accepted 83 percent of the time (Mager 1990b) but only 75 percent of the time in 1990. The current rate of wetland loss also indicates that existing regulatory programs are not overly restrictive and are not adequate to fulfill the national goal of no-net loss of wetlands.

Comprehension of the effectiveness of federal wetland regulatory efforts at the national level is obscured by the lack of regional and national programmatic monitoring systems. Indicators such as this report and national wetland trend surveys indicate that wetland losses continue to occur at disturbing rates considering the recognized value of these resources and the existing legal mandates that specify their conservation. The almost total lack of follow-up and accountability once a permit is issued or a federal project initiated leaves the ultimate fate of thousands of acres of wetlands is unknown. Consequently, assessment of wetland conservation goals, such as no-net loss, is not possible. The general lack of meaningful cumulative data on wetland losses within a spatial framework such as identifiable hydrological units also precludes the opportunity to comprehend and address the management needs of a particular ecosystem.

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Table 1. Acres of habitat alteration proposed by applicants and reviewed by NMFS during 1990 under various federal regulatory programs.

Project Kind	N1	N2	Acres Proposed By Applicant	Acres Accepted By NMFS	Potential Acres Conserved	Mitigation
10	1,597	123	135.8	93.9	41.9	11.8
10/404	1,360	509	22,735.9	9,929.9	12,806.0	11,939.2
404	807	150	2,762.9	497.6	2,265.3	351.4
CFP	56	31	2,559.7	2,542.7	17.0	79.6
CG	31	4	16.4	16.4	0.0	16.5
I10	23	4	1.4	1.1	0.3	0.0
I10/404	79	22	3,044.0	2.3	3,041.7	133.5
I404	167	29	26.4	7.7	18.7	15.1
Total	4,120	872	31,282.5	13,091.6	18,190.9	12,547.1

N1 = Total projects reviewed in this category.

N2 = Number of projects where acreage was determined.

10 = Projects requested pursuant to Section 10 of the River and Harbor Act;

404 = Projects requested pursuant to the Clean Water Act;

10/404 = Projects advertised under Section 10 and 404 authorities;

CFP = Corps Federal Project;

CG = U.S. Coast Guard bridge / causeway permit application;

I10, I404, and I10/404 = Unauthorized projects.

Table 2. Acres of habitat alteration requested by type of projects reviewed during 1990.

Project Type	N1	N2	Proposed By Applicant	Accepted By NMFS	Potentially Conserved	Mitigation
BA	213	23	2,980.7	54.4	2,926.3	40.3
BE	21	9	1,016.6	794.1	222.5	0.3
BR	243	98	358.6	145.7	212.9	211.0
DO	855	22	0.0	0.0	0.0	0.0
HO	517	165	273.5	68.3	205.2	49.1
IN	246	67	401.9	224.9	177.0	255.0
IR	52	14	27.4	20.8	6.6	24.3
MD	419	96	2,675.5	2,572.8	102.7	80.3
MI	58	9	1,000.9	144.4	865.5	83.8
MM	12	5	18,355.0	8,405.0	9,995.0	8,401.4
NA	192	109	317.5	168.0	149.5	34.3
OI	196	22	312.9	134.2	178.7	183.7
OT	228	22	358.5	234.9	123.6	130.8
PI	185	20	50.0	49.7	0.3	46.3
SH	627	188	130.3	60.2	70.1	6.5
TR	42	2	0.3	0.3	0.0	0.0
WR	14	1	3,013.9	13.9	3,000.0	3,000.0
Total	4,120	872	31,282.5	13,091.6	18,190.9	12,547.1

N1 = Total number of projects reviewed.

N2 = Number of projects where acreage was determined.

(BA) barriers and impoundments; (BE) beach nourishment projects; (BR) bridges, roads, and causeways; (DO) docks and other minor structures; (HO) housing developments; (IN) commercial and industrial developments; etc.; (IR) irrigation and drainage works; (MD) maintenance dredging; (MI) mining and mineral exploration; (MM) marsh management areas; (NA) navigation projects, marinas, etc.; (OI) oil and gas construction; (OT) unclassified; (PI) oil, gas, and chemical pipelines; (SH) bulkheads, small fills, groins, etc.; (TR) transmission lines; (WR) wetland restoration projects.

Table 3. NMFS 1990 Habitat Conservation Efforts by State.

State	N	Acreage Proposed By Applicant			Acreage Accepted By NMFS			Potential Acreage Conserved			Mitigation Acres
		Dredge	Fill	Other	Dredge	Fill	Other	Dredge	Fill	Other	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AL	38	7.3	11.0	0.8	4.9	0.4	0.0	2.4	10.6	0.8	0.0
FL	259	247.6	446.7	4.2	201.1	289.4	3.2	46.5	157.3	1.0	227.2
GA	48	119.7	466.9	0.1	106.4	115.9	0.1	13.3	351.0	0.0	166.5
LA	66	1,333.0	597.4	16,882.1	426.4	263.9	3,402.9	906.6	333.5	13,479.2	6,740.8
MS	8	1.0	18.0	0.2	0.7	17.9	0.2	0.3	0.1	0.0	13.3
NC	234	2,272.9	650.1	365.1	2,187.2	481.5	0.9	85.7	168.6	364.2	157.0
PR	4	23.5	37.1	0.0	15.0	4.5	0.0	8.5	32.6	0.0	4.5
SC	155	1,338.3	201.3	19.6	360.5	157.1	0.1	977.8	44.2	19.5	130.1
TX	60	97.7	310.4	5,830.5	40.8	10.6	5,000.0	56.9	299.8	830.5	5,107.7
Total	872	5,441.0	2,738.9	23,102.6	3,343.0	1,341.2	8,407.4	2,098.0	1,397.7	14,695.2	12,547.1

N - Represents number of projects where acreage was determined.

Table 4. Acres of habitat alterations proposed in 1990 by habitat type.

Dominant Habitat	Proposed For Alteration	Accepted By NMFS	Potentially Conserved	Mitigation
Algae	180.3	3.9	176.4	8.1
Eelgrass	7.5	0.0	7.5	0.0
Shoalgrass	58.3	0.2	58.1	91.2
Turtlegrass	5.0	0.0	5.0	0.0
Widgeongrass	95.1	0.0	95.1	0.0
Freshwater submerged vegetation	93.7	14.6	79.1	0.0
Black mangrove	18.5	5.6	12.9	8.1
Red mangrove	32.5	0.9	31.6	5.6
White mangrove	26.0	9.5	16.5	5.9
Black needlerush	267.6	5.6	262.0	8.5
Saltgrass	397.0	2.3	394.7	2.5
Smooth cordgrass	1,167.1	50.2	1,116.9	135.4
Saltmeadow cordgrass	14,591.6	8,449.2	6,142.4	11,490.2
Threesquare	12.2	0.6	11.6	0.6
Hardwood swamp	1,856.2	389.6	1,466.6	449.8
Fresh marsh	244.7	216.8	27.9	56.2
Other marsh	350.6	85.8	264.8	197.3
Oysters	4.5	0.0	4.5	26.6
Unvegetated wetlands	11,874.1	3,856.8	8,017.3	61.1
Total	31,282.5	13,091.6	18,190.9	12,547.1

Acreages are based on a sample of 763 projects.

Table 5. Acres of habitat proposed for alteration according to the Cowardin et al. (1979) wetlands classification system.

Classification	Proposed by Applicant	Accepted by NMFS	Potentially Conserved	Mitigation Area
E 1 AB	217.0	15.0	202.0	91.5
E 1 RF	0.8	0.0	0.8	26.6
E 1 UB	9,602.7	2,035.1	7,567.6	57.4
E 2 AB	226.0	3.7	222.3	7.4
E 2 EM	16,780.5	8,641.1	8,139.4	11,885.7
E 2 FO	76.8	16.0	60.8	19.7
E 2 RF	3.7	0.0	3.7	0.0
E 2 SB	1.3	1.2	0.1	0.0
E 2 SS	12.5	1.0	11.5	0.0
E 2 UB	6.7	5.7	1.0	0.0
E 2 US	396.7	42.2	354.5	0.3
M 1 UB	329.7	262.5	67.2	2.9
M 2 UB	0.1	0.1	0.0	0.0
M 2 US	773.4	773.4	0.0	0.0
P EM	175.7	156.9	18.8	5.4
P FO	1,842.3	380.5	1,461.8	445.0
P SS5	5.9	11.9	44.0	4.8
P UB	0.1	0.1	0.0	0.0
R 1 EM	9.3	0.6	8.7	0.0
R 1 UB	371.8	350.2	21.6	0.0
R 2 EM	10.5	10.5	0.0	0.0
R 2 UB	368.1	363.4	4.7	0.0
R 3 UB	20.9	20.5	0.4	0.4
Total	31,282.5	13,091.6	18,190.9	12,547.1

E1 = estuarine subtidal; E2 = estuarine intertidal; M1 = marine subtidal; M2 = marine intertidal; P = palustrine; R1 = riverine tidal; R2 = riverine lower perennial; R3 = riverine upper perennial; AB = Aquatic bed; EM = emergent; FO = forested; RF = reef; SB = stream bed; SS = scrub shrub; UB = unconsolidated bottom; US = unconsolidated shorelines.

Table 6. Treatment of NMFS recommendations on permits issued during 1990.

COE District	N	NMFS Recommendations Accepted		NMFS Recommendations Partially Accepted		NMFS Recommendations Rejected	
Charleston	47	43	(91.5)	0	(0.0)	4	8.5)
Galveston	19	10	(52.6)	7	(36.9)	2	(10.5)
Jacksonville	37	11	(29.7)	14	(37.9)	12	(32.4)
Mobile	17	14	(82.3)	1	(5.9)	2	(11.8)
New Orleans	43	26	(60.5)	11	(25.6)	6	(13.9)
Savannah	9	9	(100.0)	0	(0.0)	0	(0.0)
Wilmington	120	106	(88.3)	4	(3.4)	10	(8.3)
Total	292	219	(75.0)	37	(12.7)	36	(12.3)

N refers to number of permits sampled.

Numbers in parentheses refer to percent of the projects reviewed.

Table 7. Acres of habitat permitted for alteration over NMFS objections during 1990.

COE District	N	Proposed By Applicant	Accepted By NMFS	Permitted By COE	Percent Difference	NMFS Recommended Mitigation	COE Permitted Mitigation
Charleston	47	18.0	16.7 (92.6)	17.7 (98.5)	(5.9)	3.6	3.9
Galveston	19	1,051.0	22.8 (2.2)	50.0 (4.8)	(2.6)	4.9	21.4
Jacksonville	37	51.9	15.9 (30.7)	51.1 (98.4)	(67.7)	15.1	49.3
Mobile	17	50.6	37.4 (73.9)	39.2 (77.6)	(3.7)	0.5	8.9
New Orleans	43	12,671.7	2,925.2 (23.1)	10,633.3 (84.0)	(60.9)	2,286.2	2,436.2
Savannah	9	3.1	3.1 (98.4)	3.1 (98.4)	(0.0)	0.8	0.8
Wilmington	120	315.0	187.1 (59.4)	189.3 (60.1)	(0.7)	25.3	21.8
Total	292	14,161.3	3,208.2 (22.6)	10,983.7 (77.6)	(55.0)	2,336.4	2,542.3

N refers to number of permits sampled.

Numbers in parentheses refer to percent of the acreage proposed.

Percent difference column is percent habitat alterations accepted by NMFS subtracted from the percent permitted by the COE.